Lightning Web Updates, Data Metrics, and Outreach

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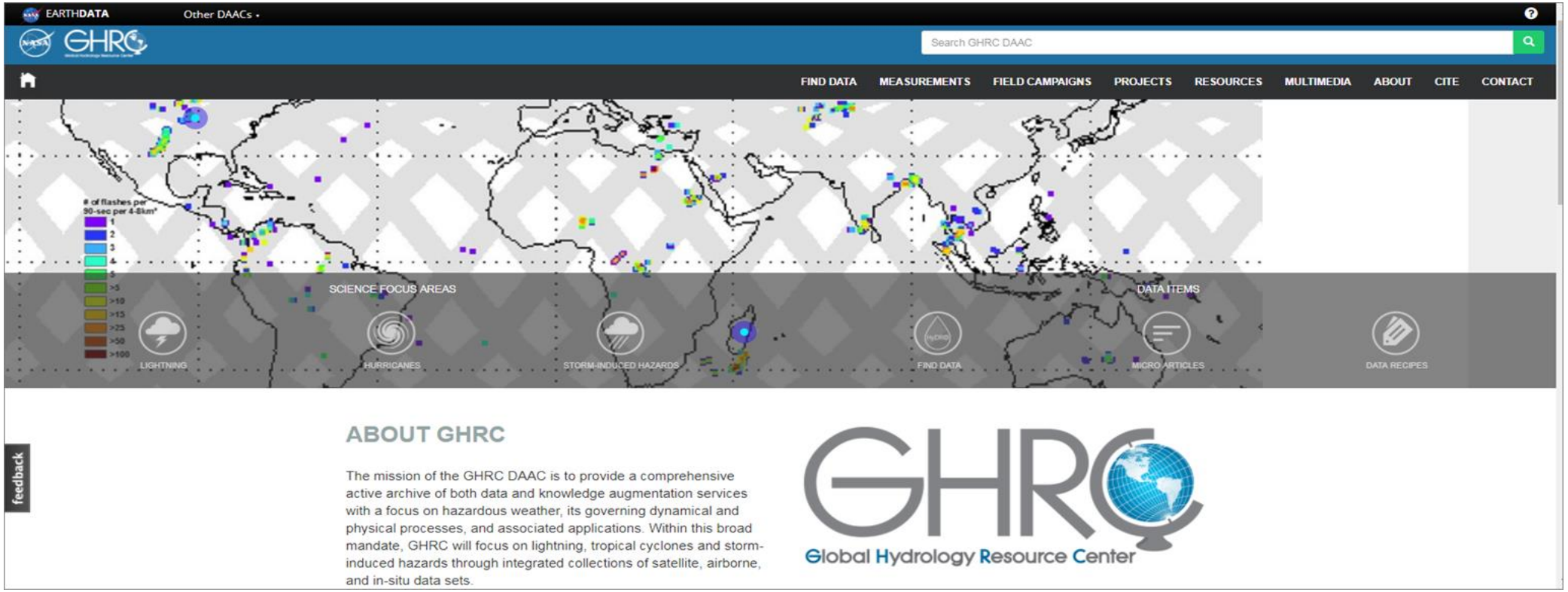
GHRC ISS LIS Outreach and User Support at GHRC

- LIS data first available through GHRC website in August 2017
- Outreach team has spent time this year focusing on improving lightning information available to users and getting lightning data noticed



Lightning Support at GHRC

- We assisted NASA with activities, helping them to focus on lightning also
  - User Profile
  - LIS article

User Profile: Dr. Rachel Albrecht

Who uses NASA Earth science data? Dr. Rachel Albrecht, to pinpoint global lightning hotspots.

Dr. Rachel Albrecht climbing to the observation level of the Amazonian Tall Tower Observatory (ATTO), located

Dr. Rachel Albrecht, Professor, Department of Atmospheric Sciences, University of São Paulo Brazil

Research interests: Cloud electrification, lightning nowcasting of severe weather, cloud-aerosol-precipitation interactions (CAPI), and local circulation effects on convection.

Research highlights: If you live an 80-year life, your chance of being struck by lightning are 1 in 13,500, according to the National Weather Service (NWS), with a 1 in 1,083,000 chance of being struck in a given year. But lightning seems to play favorites, both for people and locations.

Roy Sullivan, for example, had what could be described as an attractive personality. Sullivan (1912-1983), a park ranger in Shenandoah National Park in Virginia, was reportedly struck by lightning seven times between 1942 and 1977. Aside from his hair catching on fire

New Lightning Imaging Sensor to be Installed on the International Space Station

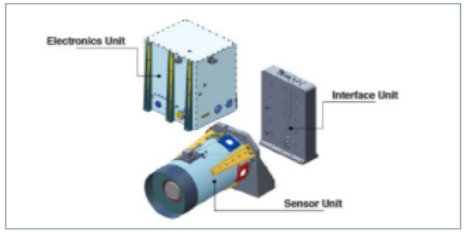
The installation of a Lightning Imaging Sensor (LIS) on the International Space Station (ISS) will enable detection of 98% of Earth's lightning on an annual basis.

Josh Blumenfeld, EOSDIS Science Writer

When the joint NASA/Japan Aerospace Exploration Agency Tropical Rainfall Measuring Mission (TRMM) satellite re-entered Earth's atmosphere in 2015, it left an invaluable 17-year record of Earth observation data collected by TRMM's five instruments. One of these instruments was the Lightning Imaging Sensor (LIS), which collected data on day and night cloud-to-ground/water, cloud-to-cloud, and intra-cloud lightning and its distribution around the globe.

Now, a new LIS is headed to the International Space Station (ISS) that will continue and enhance this data record. The instrument is part of the Space Test Program-Houston 5 (STP-H5) mission, which is aboard the upcoming ISS cargo resupply mission (designated CRS-10). CRS-10 is scheduled for launch in mid-February 2017.

In all fairness, the LIS headed to the ISS is not really "new." It actually is the spare LIS that was built at the same time as TRMM's LIS and is identical to the TRMM instrument. After attachment to the ISS' ExPRESS Logistics Carrier-1, LIS is expected to collect lightning data for two to four years or longer. These data and data products will be available through NASA's Global Hydrology Resource Center (GHRC) DIstributed Active Archive Center (DAAC), which also is the home for TRMM LIS data.

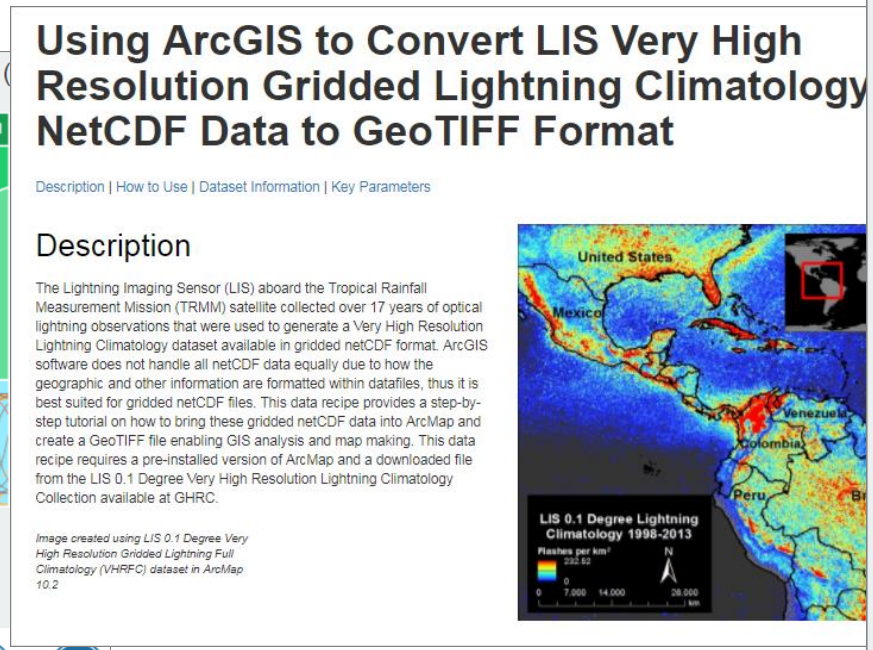


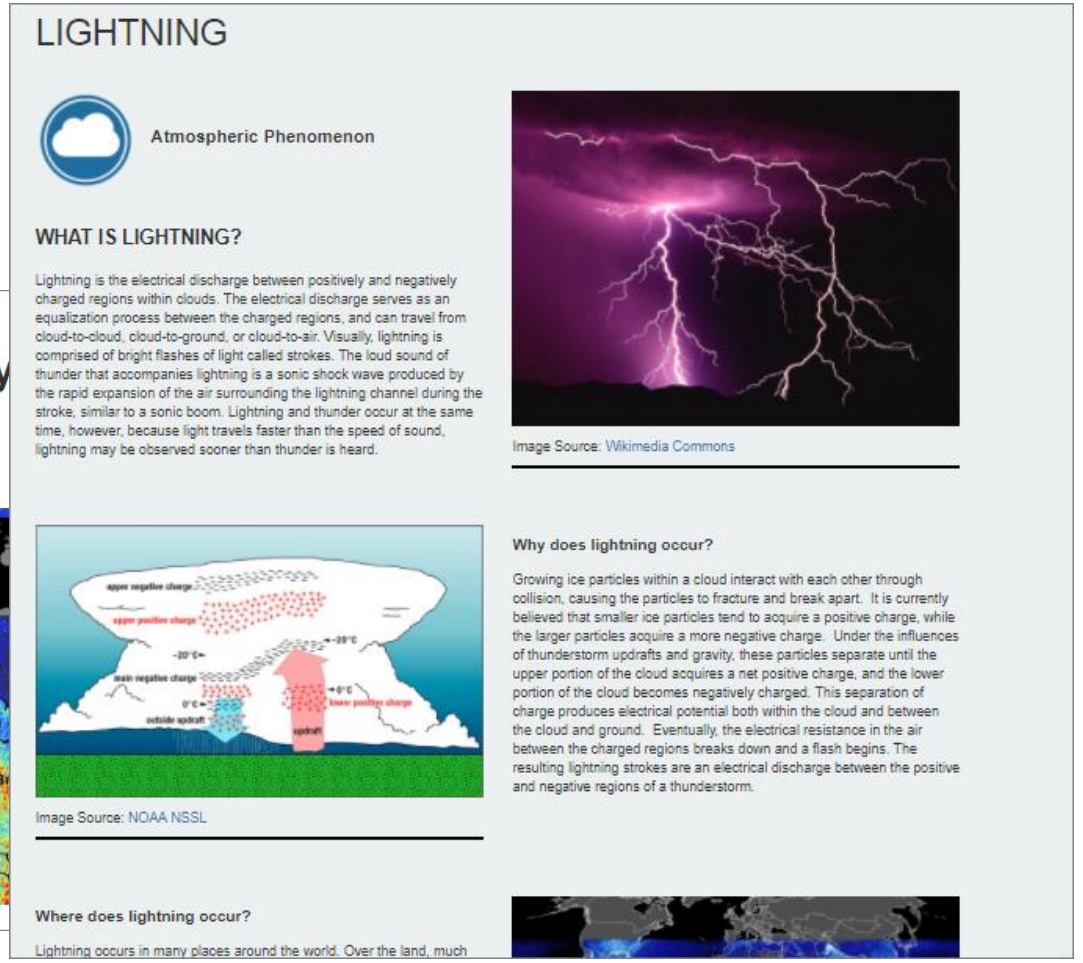
The LIS instrument comprises the sensor and an electronics unit. LIS is designed to detect and pinpoint

LIS on ISS builds on the observations from LIS on TRMM as well as lightning data collected by the earlier Optical Transient Detector (OTD), which was operational from

Lightning Support at GHRC

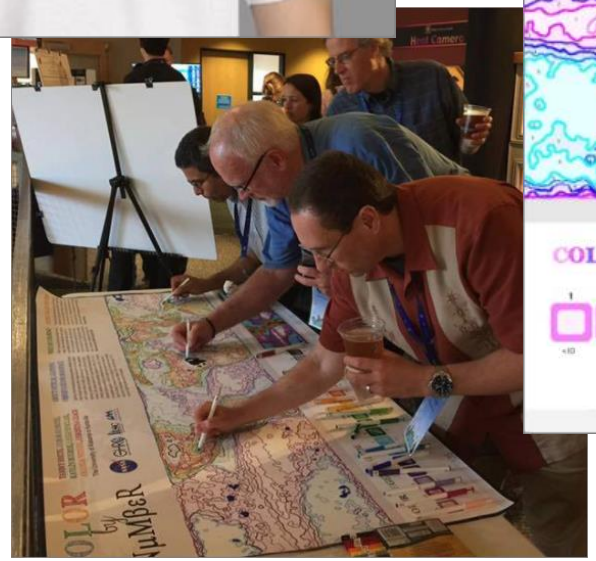
- We developed Micro Articles and Data Recipes around Lightning
  - LIS Very High Resolution Lightning Climatology and ArcGIS
  - Lightning Phenomenon Micro Article
  - Peterson's Publication Micro Article
  - Albrecht's Publication Micro Article
  - OTD Instrument Micro Article

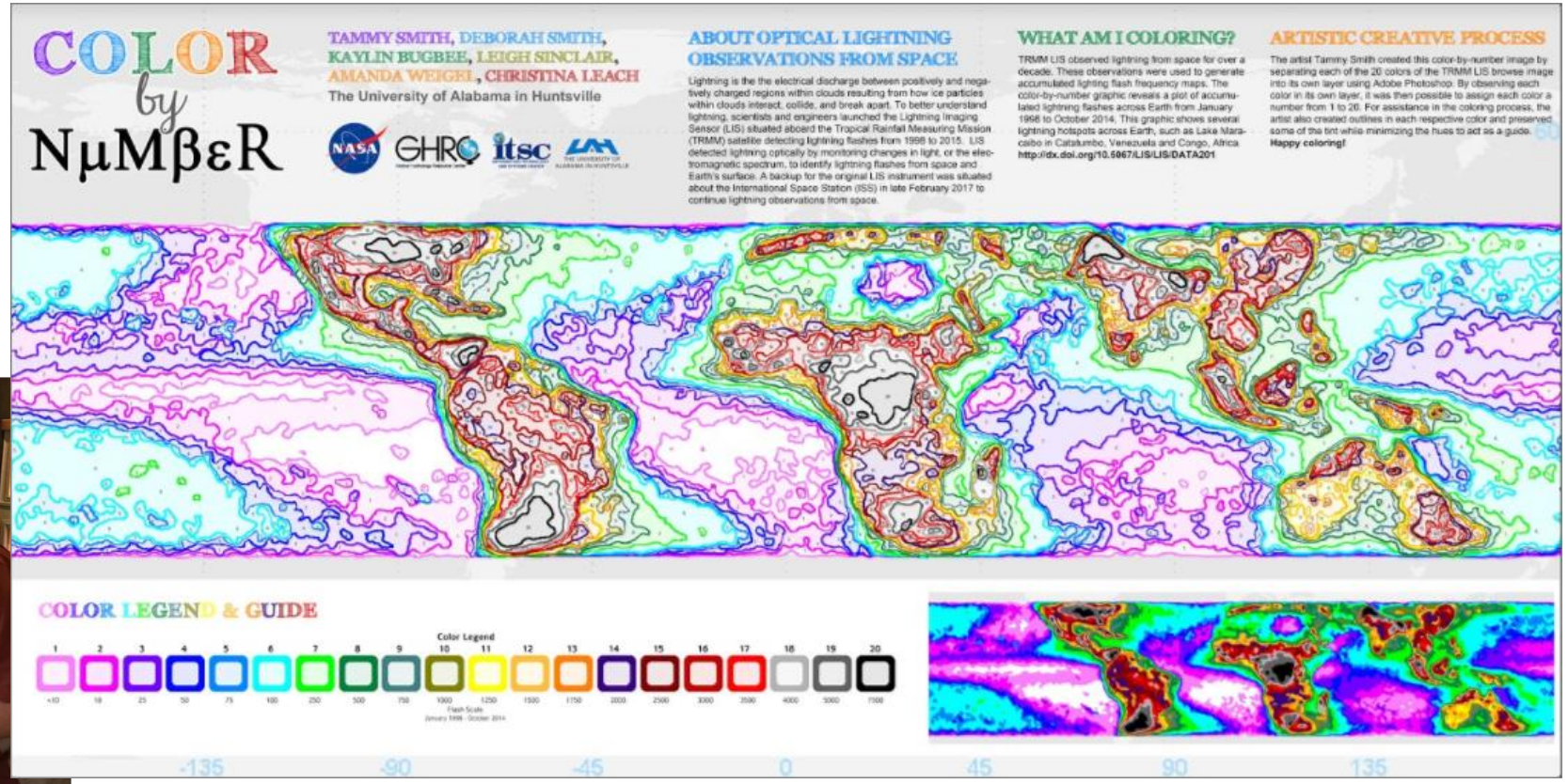




Lightning Support at GHRC

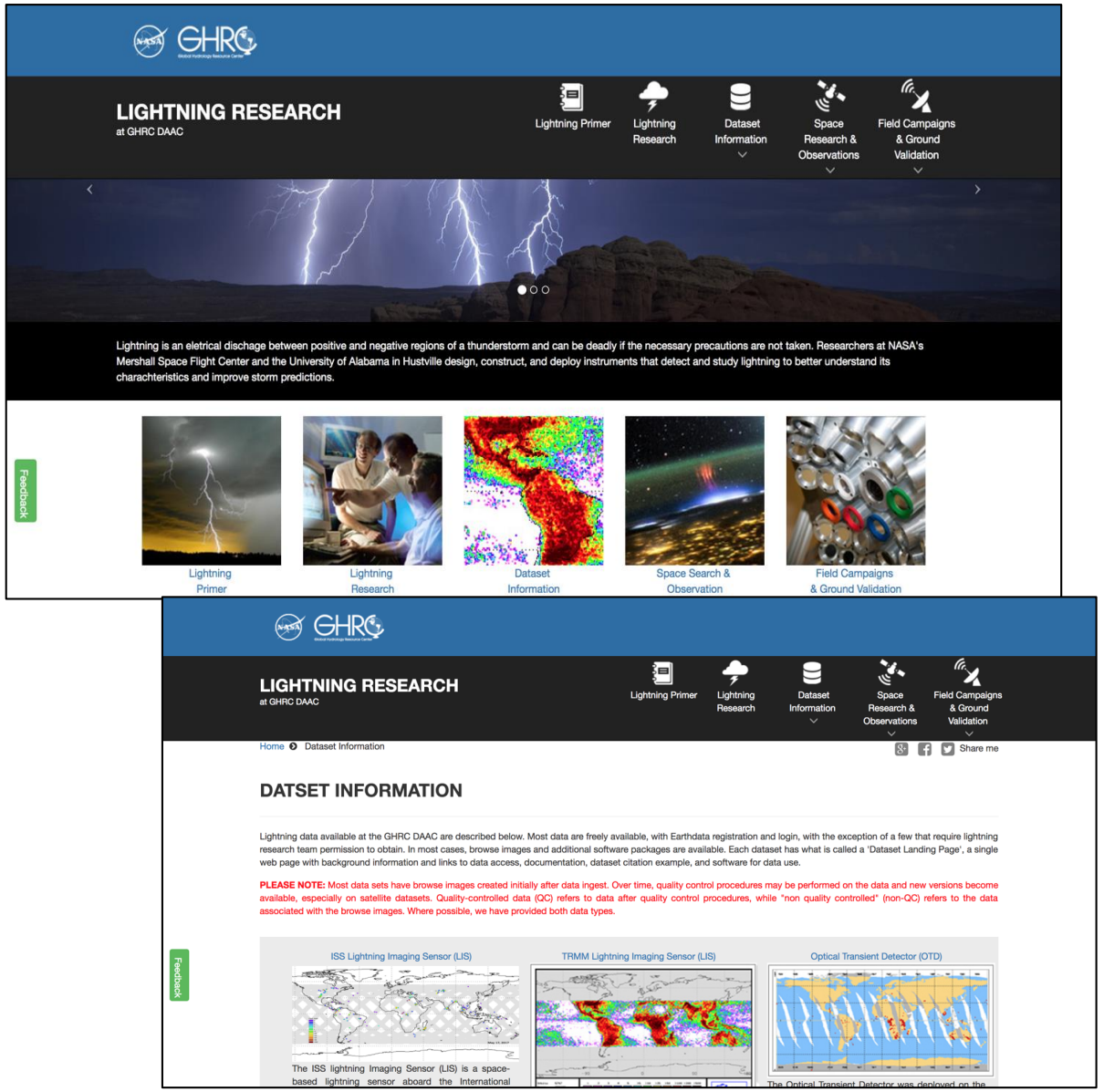
We took lightning data to the Summer ESIP Research as Art Session. This will also be presented at AGU 2017 Fall Meeting and the AMS 2018 Annual Meeting





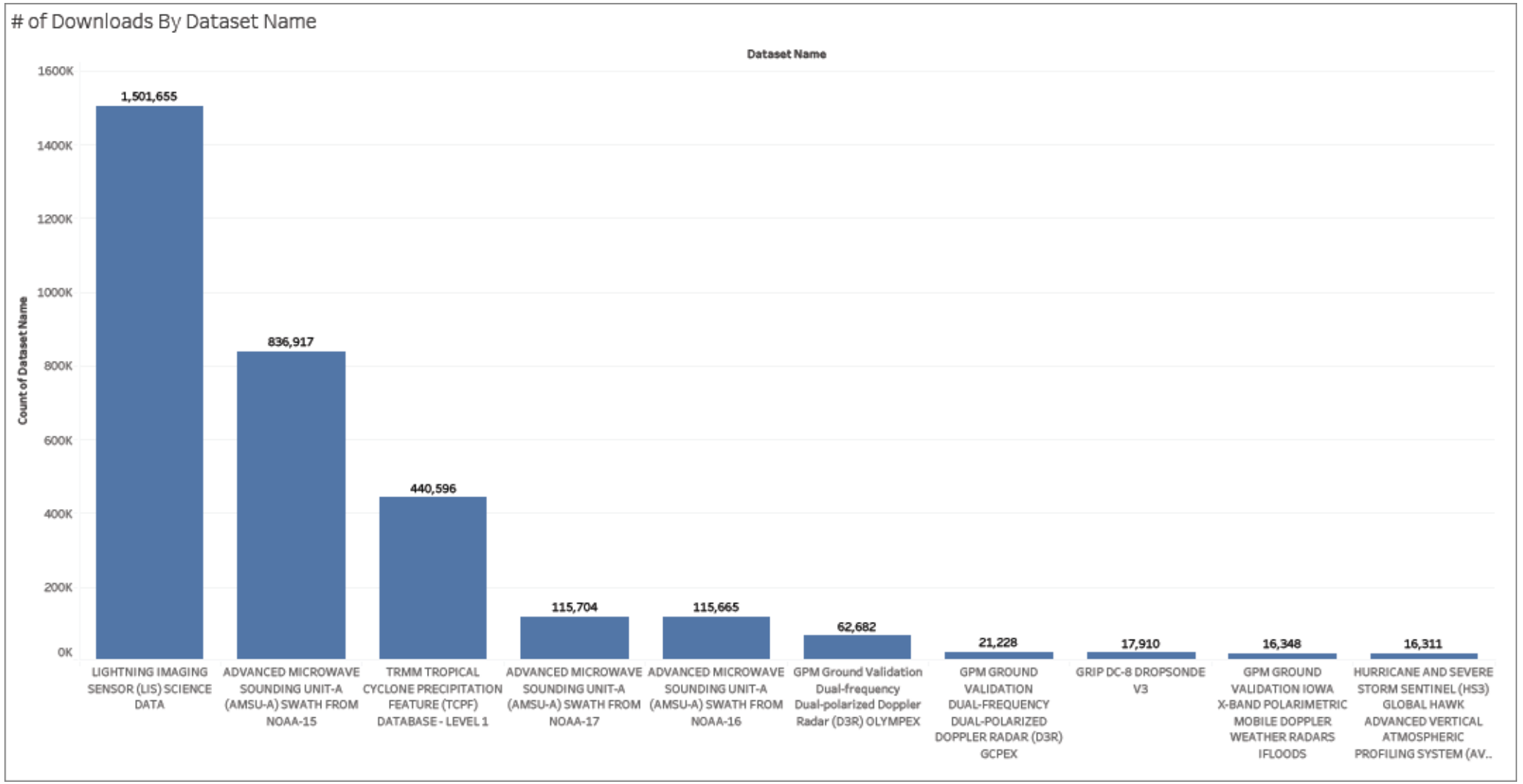
Redesigned Lightning Web Page in Progress

- New design that will be on Drupal 8 server
- Images and text updated
  - ISS and TRMM LIS datasets distinguished
  - GLM added linking to NOAA CLASS
  - Access to restricted data removed
  - Dated content removed
- Linkages improved between data, contents and GHRC web site
- Micro articles and Data Recipe links added
- Take a look at: https://lightningtest.nsstc.nasa.gov/



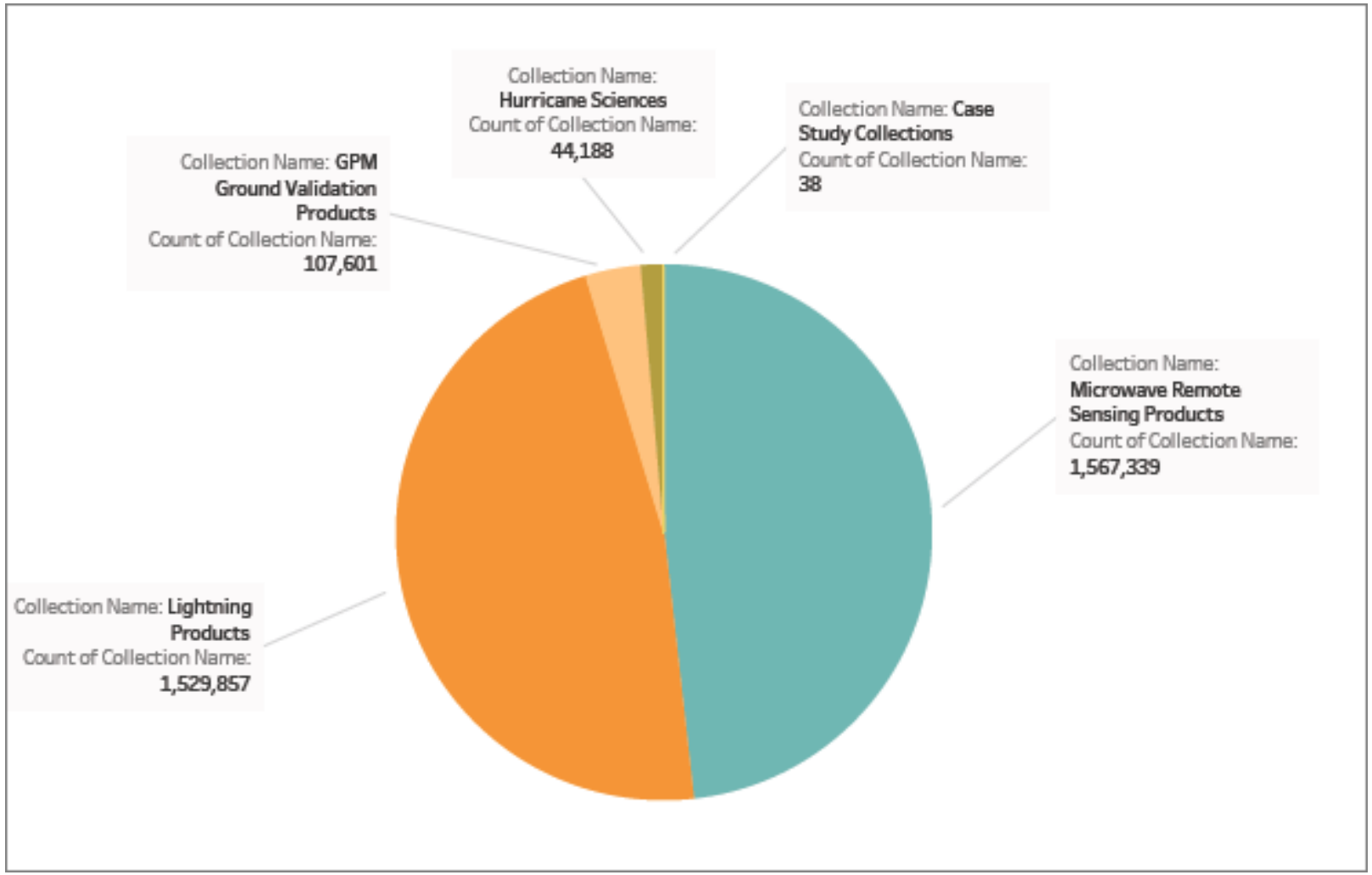
Lightning Data Download Metrics

Lightning datasets are most accessed data in 2017



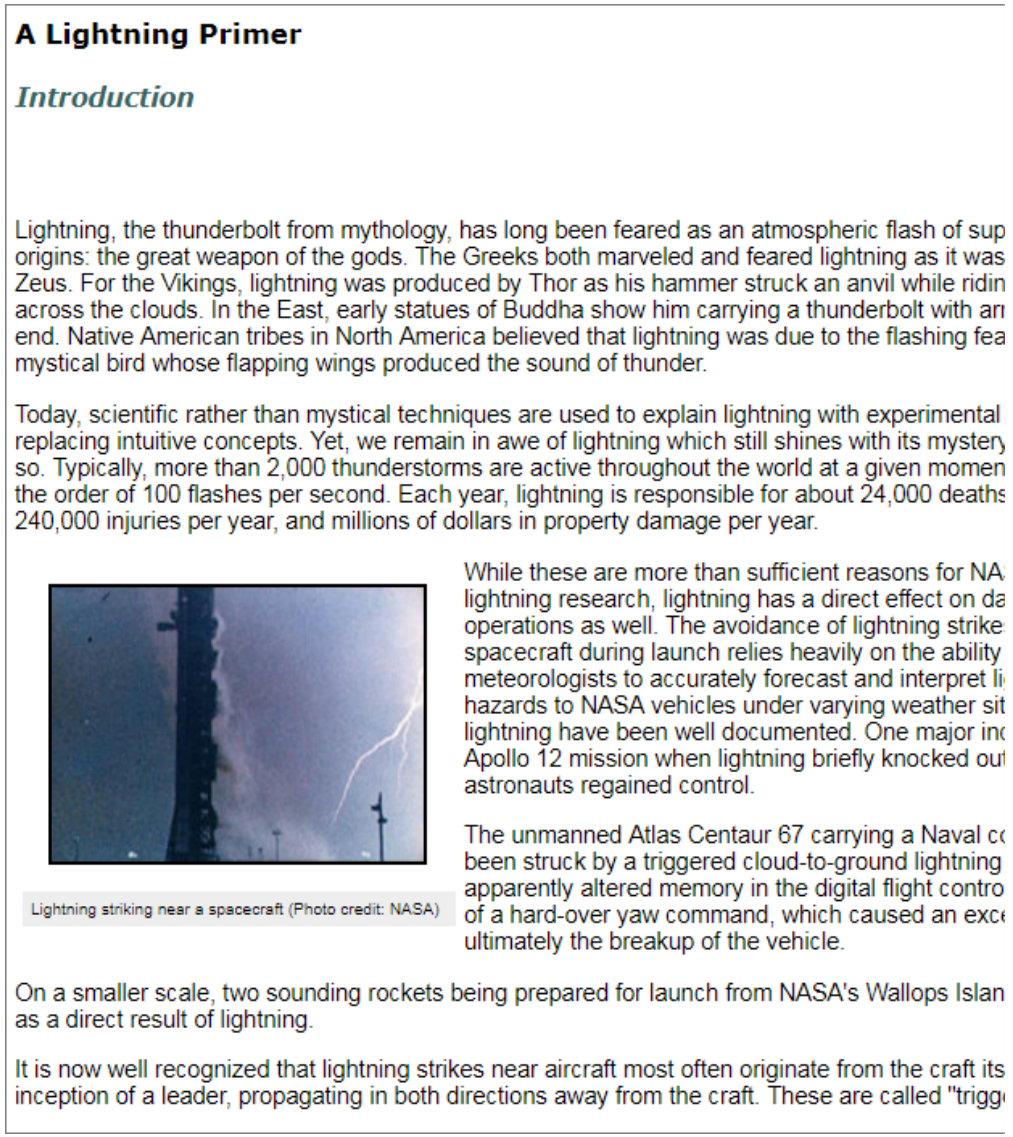
Lightning Data Download Metrics

As a collection, lighting datasets have the 2nd highest number of data file downloads



More Improvements Remain for FY 2018

- Update visualization tools as resources allow
  - browse calendar
  - google earth plots
- Further improve Lightning Primer by working with lightning team scientists and UWG members
- Complete the Lightning Virtual Collection
- Produce more Micro Articles and Data Recipes
- Develop an easy-to-use lightning product for GIS use
- Create a curated publication list aimed at high school / undergrad level
- Explore other tool ideas



A Lightning Primer

Introduction

Lightning, the thunderbolt from mythology, has long been feared as an atmospheric flash of sup origins: the great weapon of the gods. The Greeks both marveled and feared lightning as it was Zeus. For the Vikings, lightning was produced by Thor as his hammer struck an anvil while ridin across the clouds. In the East, early statues of Buddha show him carrying a thunderbolt with arı end. Native American tribes in North America believed that lightning was due to the flashing fea mystical bird whose flapping wings produced the sound of thunder.

Today, scientific rather than mystical techniques are used to explain lightning with experimental replacing intuitive concepts. Yet, we remain in awe of lightning which still shines with its mystery so. Typically, more than 2,000 thunderstorms are active throughout the world at a given momen the order of 100 flashes per second. Each year, lightning is responsible for about 24,000 deaths 240,000 injuries per year, and millions of dollars in property damage per year.

Lightning striking near a spacecraft (Photo credit: NASA)

While these are more than sufficient reasons for NA lightning research, lightning has a direct effect on da operations as well. The avoidance of lightning strike spacecraft during launch relies heavily on the ability meteorologists to accurately forecast and interpret li hazards to NASA vehicles under varying weather sit lightning have been well documented. One major inc Apollo 12 mission when lightning briefly knocked out astronauts regained control.

The unmanned Atlas Centaur 67 carrying a Naval c been struck by a triggered cloud-to-ground lightning apparently altered memory in the digital flight contro of a hard-over yaw command, which caused an exc ultimately the breakup of the vehicle.

On a smaller scale, two sounding rockets being prepared for launch from NASA's Wallops Islan as a direct result of lightning.

It is now well recognized that lightning strikes near aircraft most often originate from the craft its inception of a leader, propagating in both directions away from the craft. These are called "trigg

Discussion / Questions?

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